Know your Apple Juice for Fermented Cider

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Apples to Juice to Cider: What Changes?

Surprisingly little changes when you go from an apple to fermented cider. These eight elements remain the same in both apples and fresh juice:

**Water *Sugar *Sugar Alcohols *Acid *Nitrogenous Compounds *Tannins *Aroma Compounds *Pigments*

One item that might have caught your eye is sugar alcohols. You thought your apple or fresh juice was alcohol-free? Well it is; the name is confusing and doesn't actually refer to alcohol or ethanol but to its chemical structure, which is different from sugar. When we ferment the juice, alcohol, or more precisely ethanol, joins the list. If the cider is finished to full dryness, all the sugars are removed, so that one drops from the list. Since the sugar predicts the alcohol you want to understand how to measure it in your juice.

Specific Gravity, Brix, and Predicting the Future?

This is a good point at which to talk about specific gravity (SG) and Brix, which both measure the sugars present in juice and cider. Specific gravity describes the relative density of the juice compared to water. Water has a specific gravity of 1.000, so any sugar present raises that level. Apple, pear, and other juices have specific gravities that usually range from 1.045 to 1.065.

In the world of wine, it's about Brix, which measures sugars in grapes. But apple juice, being about 90 percent water and 10 percent soluble liquids, doesn't do so well with Brix refactors, which are calibrated against pure sucrose. Once fermentation begins and there is the presence of ethanol, Brix refactors don't work anyway. Luckily, simple and inexpensive devices like hydrometers give you both readings and they work really well for cidermakers. If you are curious and want to compare notes with a winemaking friend, there are tables to convert specific gravity to degrees Brix; a specific gravity of 1.040 equals 10.0° Brix.

Why is it important to know the density of your juice? Because as the juice ferments, the sugars are converted to ethanol and carbon dioxide in roughly equal amounts, lowering the

density of the juice. By measuring the specific gravity during the fermentation stage, you can get a pretty good idea of how much of the sugar has been devoured by the yeasts and converted to alcohol. When your reading is at 1.000 or below, you can feel pretty confident that all the work has been done. You might be thinking, "How could it get below 1.000, which is the baseline of water?" It's because ethanol has a lower specific gravity than water, so on higher alcohol ciders that are fully fermented to dry, you will get readings below 1.000.

One Final Measurement...

Along with measuring specific gravity, it's also useful to measure the temperature of both the cider and the proofing liquid of the yeast. It's important to know these temperatures because you don't want too much of a difference, which may cause the yeast to go into shock and die off prematurely.